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ABSTRACT

After completing a search of educational and training literature, and reviewing practices and criteria employed by 18 Army schools in evaluating instructors, a model of the functions of a master instructor was developed. Based upon two main rationales (Systems engineering and a behavioristic concept of learning), the model encompassed four areas of performance; (1) training programs, (2) instructor classroom behaviors, (3) professional growth, and (4) innovative practices. The areas were apportioned into 17 functions and 80 tasks. Task statements were phrased in the form of instructor performance objectives. The model can provide guidance in the development of prototype procedures and materials for the training instructor, and it can aid in devising procedures and forms for the evaluation of instructors. (Author/BP)

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A Model of the Functions of a Master Instructor

William H. Melching and Paul G. Whitmore

HUMAN RESOURCES RESEARCH ORGANIZATION
300 North Washington Street • Alexandria, Virginia 22314

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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William H. Melching and Paul G. Whitmore

HumRRO Western Division
Fort Bliss, Texas

HUMAN RESOURCES RESEARCH ORGANIZATION

Exploratory Research 91

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The Human Resources Research Organization (HumRRO) is a nonprofit corporation established in 1969 to conduct research in the field of training and education. It is a continuation of The George Washington University Human Resources Research Office. HumRRO's general purpose is to improve human performance, particularly in organizational settings, through behavioral and social science research, development, and consultation. HumRRO's mission in work performed under Contract DAHC 19-73-C-0004 with the Department of the Army is to conduct research in the fields of training, motivation, and leadership.

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FOREWORD

This report describes some of the results of a research effort undertaken by the Human Resources Research Organization as a part of Exploratory Research 91. The objective of ER-91 was to develop procedures and materials for training and evaluating Army instructors in order to improve their classroom effectiveness. The present report describes the first activity that was undertaken in this effort—the generation of a model of instructor functions.

The research was conducted at HumRRO Western Division at Fort Bliss, Texas (formerly HumRRO Division No. 5). Dr. Albert L. Kubala was Director when the research was performed. Dr. William H. Melching served as the Research Leader. Dr. Paul G. Whitmore assisted in the development of the model. Military support was provided by the U.S. Army Air Defense Human Research Unit, of which LTC Frank R. Husted was the military chief; LTC Frank D. Lawler is currently the military chief.

Subsequent research activities in this area will be undertaken under Work Unit CLASSROOM and will be focused on the development of prototype procedures and materials for training and evaluating Army instructors.

HumRRO research for the Department of the Army for Exploratory Study 91 was conducted under Contract DAHC 19-73-C-0004. Army Training Research is performed under Army Project 2Q062107A745.

Meredith P. Crawford
President
Human Resources Research Organization

PROBLEM

The continuous need for skilled instructors imposes a considerable burden on Army schools and related training agencies. Confronted with inflexible budgets and limited training times, instructional departments must identify characteristics of effective teaching and train instructor personnel to provide it.

While the characteristics of effective instruction are admittedly not well defined, typical instructor evaluation forms used by Army schools suggest that the primary emphasis in instructor training and evaluation is on presentation skills rather than on teaching skills. To reverse this situation, a comprehensive behavioral description of the characteristics of effective teaching is required. Related to this is the need to explore means by which Army instructors may acquire techniques that will enable them to manage their classrooms more effectively.

APPROACH

The decision to construct a comprehensive behavioral description of the characteristics of effective teaching (i.e., a model of teaching) led to the undertaking of three partially concurrent activities. One activity consisted of a search of recent educational and training literature to identify references that described or specified teacher characteristics and responsibilities. A second activity consisted in drafting tentative models of teacher functions. As successive versions of the model were produced, they were reviewed and refined according to findings from the literature and from comments of internal reviewers and Army school personnel. In a third activity, sample materials used by Army schools in evaluating the performance of instructors were obtained and analyzed. Evaluation forms, evaluation criteria, and instructions to evaluators were obtained to provide concrete examples of desired characteristics from the point of view of Army schools.

RESULTS

Army School Practices

Information and evaluation materials were received from 18 Army schools. These data showed that, while schools agreed on several criteria of instructor performance, many schools employed criteria not routinely used by others. In fact, to encompass all kinds of performance on which the Army schools evaluated instructors, some 49 different criteria of performance were required (some criteria were stated too cryptically to permit meaningful evaluations).

A comparison of school criteria with the performance objectives cited in the model showed some overlap, but schools tended to include many instructor activities that were not made a part of the model. Some discrepancies resulted because of differences in terminology and variations in amount of descriptive detail.

The Model

Support of the model rests on two main rationales. First, it is postulated that effective instruction requires rigorous application of principles of systems engineering. To be effective, the instructor must be able to implement the steps of the systems engineering approach to the design of instruction. Second, a behavioristic concept of learning was adopted, namely, that conditions and events in the classroom constitute the most significant factors influencing student learning and performance.

These and other rationales provided the basis for generation of a model that encompasses four areas of performance, as follows:

Area I. Training Programs
Area II. Instructor Classroom Behaviors
Area III. Professional Growth
Area IV. Innovative Practices

These areas were apportioned into 17 functions and 40 tasks; some tasks were further analyzed into subtasks. Task statements were viewed as the level of behavior of greatest utility, and they were phrased in the model as instructor performance objectives.

CONCLUSIONS

The model can provide explicit guidance in the development of procedures and materials to be used in training Army instructors. In addition, the model can aid in devising procedures and forms for the evaluation of instructor performance.

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A Model of the Functions of a Master Instructor

MILITARY PROBLEM

The impetus for this research effort was two-fold—a need to identify the criteria by which the performance of Army instructors is typically evaluated, and a need for instructors to acquire more effective classroom management techniques.

As one of the largest training organizations in the world, the Army has a massive and continuing need for effective instruction. While some of its training needs are relatively routine and can be accomplished in on-the-job settings, much of the training is highly technical and requires the facilities and capabilities of formal instructional institutions, imposing a considerable burden on these institutions. Furthermore, in light of current policies of short-term assignment for instructor personnel, supplying sufficient instructors requires the continuous operation of instructor training programs. Thus, departments in Army schools responsible for providing instruction—and/or training of instructors—have a significant investment in identifying characteristics of effective teaching.

Unfortunately, many of the characteristics of classroom performance on which Army instructors are presently evaluated appear to have little relationship to effective teaching. Based upon comments of instructors and examination of typical instructor evaluation forms, it is apparent that the emphasis in instructor evaluation is directed more toward *presentation* skills than toward *teaching* skills. To help instructional departments produce more effective instructors, and to enable more meaningful evaluations of instructor performance, a comprehensive behavioral description of the characteristics of effective teaching is needed.

A companion problem concerns the need for special classroom management techniques to be made available to instructors. An educational management procedure that has received much attention is called "contingency management." While this classroom technique has shown promising results in recent years for both adults and children, the acquisition of these capabilities by Army instructors has not been fostered. Contingency management refers to a set of procedures for the more effective direction and control of students to enhance learning. The means by which contingency management techniques may be most effectively acquired must be explored to increase the capabilities of Army instructors to manage their classrooms.

RESEARCH PROBLEM

The overall objective of this HumRRO Exploratory Research effort is to develop procedures and materials for training and evaluating Army instructors in order to improve their classroom effectiveness. To accomplish this objective, two separate research efforts were undertaken.

The first sought to develop a model of the functions to be performed by an instructor in the classroom in the process of bringing about learning by students. It was believed that, with the development of a comprehensive behavioral model of teacher functions, definitive descriptions of effective teaching performance could be derived. These descriptions, in turn, could serve as explicit sources of guidance in designing materials for the training and evaluation of instructors. The present report is concerned only with the activities and products associated with accomplishing the first effort.

The second effort, a natural corollary of the first, is focused on the development of procedures and materials for training and evaluating instructors in the performance of functions delineated by the first effort. This is the goal of Work Unit CLASSROOM; findings from this effort will be reported at a later time.

RESEARCH APPROACH

As a first step in devising the model, a search of recent educational and training literature was undertaken, placing special emphasis on references that described or specified teacher characteristics or responsibilities. As candidate functions and tasks were found, a series of tentative models of teacher functions were developed. With each version, a concerted effort was made to increase comprehensiveness and validity.

As drafts of the model were prepared, they were circulated among members of the research staff for their comments and evaluations. Successive drafts were also submitted to several education and training specialists at the U.S. Army Air Defense School. Reactions were obtained from several instructional departments, including the staff of the Instructor Training Branch.

Early in the effort, it became apparent that what was being developed was a conception of an instructor who could perform a broad range of instructor functions. To capture this image, it seemed convenient to label him a "master" instructor. This term was intended to depict a person with wide instructional capabilities—not necessarily one who was a senior instructor or one with many years of teaching experience. In short, he was viewed as someone who has mastered effective techniques of teaching.

Simultaneously with the literature search, information about evaluation procedures and materials currently in use in Army schools was sought. A letter to each Army school from the Chief, U.S. Army Air Defense Human Research Unit, requested sample materials used by each school in evaluating instructor performance. Evaluation forms, evaluation criteria, and instructions to evaluators were specifically requested.

REVEIW OF ARMY SCHOOL PRACTICES

Information about evaluation practices and criteria and sample evaluation materials were received from 18 Army schools. (A list of the schools is given in Appendix A.) The materials showed that, while there is substantial agreement among schools as to kinds of performance typically evaluated, there is also considerable diversity. Table 1 shows the main criteria used by schools in evaluating an instructor's performance, and indicates criteria used by each school.

In interpreting Table 1, certain factors or characteristics in the data should be noted. First, the table lists only the *main* categories or criteria used by schools to evaluate performance—numerous subordinate criteria could also have been cited. Unfortunately, if this had been done, the list of criteria would be long and unwieldy. Designation of a criterion as main or subordinate was based, in all but two instances, on the headings provided on the evaluation forms used by the schools. In two instances, the forms did not depict an ordinate-superordinate relationship among criteria, and the researcher had to make that determination himself.

Second, no claim is made that the criteria listed in Table 1 are exhaustive. Some schools did not respond to the request for evaluation materials and such schools could conceivably use criteria not included in the list. However, the criteria listed are believed to be representative.

Table 1

Main Criteria of Performance as Used by Various Army Schools to Evaluate Army Instructors[a]

Main Criteria	Schools[b]																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1. Introduction		1		5	1	2		5				1	6	2		2	1	
2. Explanation/Demonstration		2		6	2	3	3											
3. Instructor Qualities		3	4		3	7	1					3	3		2			
4. Speech Techniques	6	4	5		4				5				2	3			3	2
5. Training Aids	4	5	3	7	5				2	6	2	4		7			4	7
6. Class Participation		6			6													6
7. Review and Critique		7			7	6												
8. Preparation	3	8	6		8		5			1		6			1			4
9. Presentation	1		2			1	2			4		2	4		3			
10. Organization (of instruction)	2																	5
11. Voice (Qualities)	5							1					1					
12. Body Movements	7																	
13. Enthusiasm	8																	3
14. Poise/Confidence	9																	
15. Attitude Toward Class	10																	
16. Class Organization			1															
17. Interest of Trainees			7															
18. Training Site			8															

(Continued)

Table 1 *(Continued)*

Main Criteria of Performance as Used by Various Army Schools to Evaluate Army Instructors[a]

Main Criteria	Schools[b]																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
19. Instructor Appearance				1				3	4							1	8	1
20. Platform Manner				2														
21. Classroom Management				3					1	8						3		
22. Oral Expression				4														
23. Questions and Discussion				8										6			7	
24. Summary				9				7						12				
25. Student-Instructor Relationships				10														
26. Subject Coverage				11														
27. Technical Competence				12						5								
28. Application						4												
29. Examination						5			6					11				
30. Classroom Appearance							6							1				
31. Class Lights, Heat, etc.							7											
32. Skill of Attendant							8											
33. Communication Skills								2										
34. Teaching Personality								4								2		
35. Body (of presentation)								6					7			5		
36. Student Response								8			3	5		8				

(Continued)

Table 1 *(Continued)*

Main Criteria of Performance as Used by Various Army Schools to Evaluate Army Instructors[a]

Main Criteria	Schools[b]																	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
37. Objectives Stated									3									
38. Facilities										2								
39. Lesson Plan										3								
40. Objectives Attained									7	7								
41. Relevance to Vietnam										9								
42. Instructor (practices)											1							
43. Conference Techniques							4						5					
44. Conclusion													8					
45. Personal Qualifications														4				
46. Ability to Instruct														5				8
47. Conducting Demonstrations														9				
48. Use of Films, TV, etc.														10				
49. Contingent Items															4			

[a]The numbers in a school column refer to the order in which the school listed the observation categories.

[b]This analysis was not intended to be a criticism of schools; therefore, identity of schools is not given.

Third, the criteria are not necessarily independent. For example, Criterion 22, Oral Expression, might be viewed as comparable to Criterion 4, Speech Techniques, or as subordinate to Criterion 3, Instructor Qualities. From the point of view of some schools, several of the criteria listed should be subordinate rather than main criteria. Among the criteria that might be classified as subordinate are 12, Body Movements; 13, Enthusiasm; 28, Application; and 26, Subject Coverage.

Fourth, as presently cited, the criteria are probably too cryptic to permit meaningful evaluations and comparisons. The several one-word criteria are particularly opaque. Even when the reviewer has an elaboration of a given criterion, he may have difficulty comparing it with another. In addition, there is a tendency for schools to approach the evaluation problem from widely different perspectives. Thus, one school may hook the evaluation onto the beginning, middle, and end of an instructional presentation. A second school may focus primarily on instructor qualities and on the instructor's appearance, while a third may stress the physical environment in which the instruction occurs. Thus, although all may be interested in the same things ultimately, their orientations to the problem of evaluation are patently different.

Fifth, the first eight criteria listed in Table 1 were taken from an Army Field Manual.[1] This manual suggests that they are elements of instructor performance that may be rated when evaluating student instructors or when supervising experienced instructors. Two schools (B and E) used these criteria exclusively—others used from one to four of them.

Sixth, values in Table 1 refer to the order in which criteria appeared on each school's evaluation form. It was believed that this order might constitute a rough index of the relative importance of criteria. Naturally, some could hardly be placed first (e.g., summary, conclusion, examination), but even so, it is obvious from the table that schools showed little agreement with respect to order. The order of criteria might depend upon whether an observer made evaluations throughout the class hour or whether he made them only at the end of instruction. In any event, this finding would seem to be consistent with the tendency for schools to approach the evaluation problem from different perspectives.

A final general comment about the evaluation criteria concerns terminology. Although the terms used by the schools were at times confusing and troublesome to interpret, differences among schools may be more apparent than real. They may reflect differences in terminology more than in actual criteria; subtleties in meanings intended by the schools cannot always be confidently deciphered. The result is that some injustice is bound to occur. An indication of the range of the communication problem is depicted in the examples below.

One school used the term "classroom appearance" even though, as shown by accompanying rater instructions, the primary matter of concern was the appearance of the instructor—not the classroom. Some schools combined criteria that others used independently. Examples are "voice and speech techniques," "questions (questioning) and discussion," and "instructor qualities and speech techniques." While criteria of "subject coverage," "technical competence," and "ability to instruct" were cited as separate items, one might defend combining them into a single criterion. Conversely, a case might be made for including the following behaviors as separate criteria: "contact with class," "logical development," and "checking understanding." Comparable interpretations might be made of numerous other instructor behaviors.

While one might argue against a requirement that all schools should evaluate instructors according to a single set of fixed criteria, the diversity of criteria shown in Table 1 indicates that some effort at establishing commonly agreed upon instructor

[1] U.S. Army Field Manual 21-6, *Techniques of Military Instruction*, January 1967.

behaviors might be desirable. The development of a model of instructor functions would represent one possible approach. Such a model may not be able to incorporate all the diversity cited here, but it can do much toward providing an organization and a structure to a very complex set of behaviors.

REVIEW AND EVALUATION OF THE LITERATURE

While every instructor who has prepared and presented instruction is likely to believe that he is an effective instructor, a search of the educational and training literature will soon show that there are no universal criteria by which effective instruction may be identified (Ornstein, 1).

In an extensive study of teacher characteristics, Ryans (2) suggested that a teacher is effective to the extent that his performance leads to the development of basic skills, understanding, good work habits, desirable attitudes, value judgments, and adequate personal adjustment of the pupil. Ryans points out that although this is an operational appearing definition, no one has been able to expand it and arrive at the specific characteristics of effective teaching.

A somewhat similar conception of effective teaching is proposed by Sandefur and Bresslar (3). They view effective teaching as the development of a relationship between the teacher and student that fosters the optimal acquisition by the student of the instructional objectives. The objectives are directed at the development of understanding, insights, concepts, attitudes, and the assimilation of factual content. Still other definitions may be found, each one adding a little to the two above.

Some researchers feel that teaching behavior cannot be defined or analyzed (Goheen, 4). There are simply too many possible traits of interest. A related conception suggests that "teaching is art," and that attempts to view it as a technology (e.g., Skinner, 5) are premature and overly ambitious. No matter what the basic position, there is likely to be ready agreement that it is easier to recognize good teaching than it is to describe it objectively! In short, while raters of teacher effectiveness may agree fairly well in their judgments, they tend to base their judgments on different criteria.

Recent literature in the area of teacher education yields a diversity of information. For example, the entire contents of two issues (Spring, 1969 and Spring, 1970) of the *Journal of Research and Development in Education* described teacher education models. While most of this literature focused on models of teacher training programs, some insights into the characteristics (or responsibilities) of effective teachers were provided.

For example, in discussing the feasibility of the Florida State University model as presented by Sowards (6), Dodl (7) maintained that there are five general teaching behaviors in which a teacher must be competent. These behaviors focused on:

(1) Formulation of objectives of instruction in observable and measurable terms.
(2) Selection and organization of content according to both the logic of the content and the needs of the learner.
(3) Use of proper strategies to enable students to achieve the behavioral objectives.
(4) Use of behavior-based evaluation procedures.
(5) Professional responsibilities.

Each of these behaviors is broadly stated and could readily be analyzed into component tasks.

Based upon their review of the literature on teacher skills, Hite and Rousseau (8) concluded that seven competencies were essential for an effective instructor.[2] Their list follows:

(1) Define the objectives of instruction.
(2) Adjust the instruction for the individual.
(3) Select appropriate strategy of instruction.
(4) Organize the learning environment.
(5) Interact with pupils for pupil success.
(6) Evaluate student growth.
(7) Define the next instructional procedure appropriate to each individual.

The authors suggested that each of the categories might be analyzed for component tasks almost indefinitely. They analyzed the competencies into 28 tasks and/or subtasks.

Still other lists of teacher responsibilities can be found. Here, for example, are the major sections of a sample task analysis of teaching as suggested by Baird (9):

I. The teacher works to improve educational opportunities for children.
   A. Participates in administrative decision making regarding policy, curriculum, and school management.
   B. Works with community to secure needs of total school program: physical facilities, financial support, respect of patrons.
   C. Assists in professional growth of teachers.
   D. Takes personal responsibility for his own professional growth.
   E. Participates in other administrative activities.

II. The teacher works for increased teacher benefits.
   A. Helps improve pre- and inservice teacher training programs.
   B. Communicates the needs of the profession to the public, administration, and profession.

This list of responsibilities, like the competencies and behaviors cited earlier, can be analyzed into numerous tasks and/or subtasks. The results of such analyses, however, are not necessarily as satisfying as one might wish. One problem, of course, is that the analyst frequently has difficulty achieving a parallelism among tasks. For example, one task statement may denote a specific teacher behavior, while a companion task statement lists a vague and ambiguous behavior. Consider these two task statements, both of which presumably were stated to represent a comparable level of specificity:

(1) Assists in research.
(2) Identifies areas for personal improvement.

Actually, the first statement is probably not a task, since a task is generally viewed as a set of related activities that occur relatively close in time and that have a definite beginning and ending point. Among other things, the number and variety of activities in which one might engage while "assisting in research" are too gross to convey much meaning or intent, although such a statement is included in some lists of teacher tasks. The second statement, by contrast, connotes more specific activities and seems to more easily satisfy the usual definition of a task. Therefore, although both statements may be called tasks, the first would seem to contain several tasks, not just one.

Any effort to place teacher functions, tasks, and subtasks into a hierarchy is plagued by this problem. Sometimes, for example, a main area of performance can be fractionated into several subordinate areas before task-level statements are made; then, simply because of the alphanumerics of the hierarchy, task statements often appear to be stated at different levels. Perhaps the practical solution is simply to acknowledge that the frame

[2] It is interesting to note that Hite and Rousseau consistently use the term "instructional manager" rather than "instructor" or "teacher." They seem to suggest that the significant functions of a teacher are to manage instruction rather than to provide it.

of reference for the concept of "task" varies on occasion, and then be as clear as possible in preparing task statements. In other words, the important concern is not whether the "level" of one task statement is at odds with another, but that a given statement of a task communicate clearly, effectively, and without ambiguity.

While none of the teacher education literature cited introduced the matter of evaluation in connection with teacher functions and tasks, one may posit an explicit connection between the two. After all, the purpose of specifying desired teacher behaviors is not only to facilitate acquisition by students of selected behaviors, but also to provide meaningful criteria by which the effectiveness of the instruction may be evaluated.

A recent and pertinent report (10) dealing with teacher evaluation is a special U.S. Office of Education publication, *Teacher Evaluation: PREP 21*[3] providing explicit guidance to persons who need to evaluate teachers. The report notes that, in planning an evaluation program, it is necessary to determine what is considered important in teaching. From this determination one can:

(1) Establish what is expected of teachers.
(2) Determine ways to measure what is happening.
(3) Design ways to compare what occurs with what is desired.

PREP 21 is consistent with the view presented here—that a meaningful evaluation of teacher performance is possible only after a determination has been made as to what teachers must do.

The PREP 21 report does not recommend criteria to use in evaluating teachers, but suggests *procedures* one might follow in determining what the criteria should be. It suggests, for example, that criteria decisions be based on the pooled judgments of experts—ideally, personnel specially trained to make the judgments (e.g., job analysts or trained observers). Persons selected to determine the criteria might include teachers, principals, supervisors, students, board members, and parents, since involving various members of the educational community may lead to more accurately defined criteria.

To acquire criterion information, the PREP 21 report recommends a position analysis technique that provides a detailed and systematic description of what is important for success. Thus, the experts would approach the criterion problem by making judgments concerning the teacher behaviors they think are most important. The PREP report appears to regard the most important behaviors as being those that have the greatest positive impact on student performance. While acknowledging that the relationship between teacher behaviors and student outcomes is sometimes determined by the situation, the report maintains that students seem to profit most from a teacher who:

(1) Accepts and uses ideas and opinions of pupils.
(2) Is flexible and adjusts behavior and strategies to situations and students.
(3) Views teaching as a complex task that requires goal setting, individual student assessment, and decision making in terms of immediate and long-range problems.
(4) Provides students with a framework within which to interpret information.

Like the previous lists of teacher behaviors, these statements are quite general and may be analyzed into more specific functions and tasks. Of greater significance, however, is the implication that an important criterion of teacher effectiveness is *student acquisition*. This viewpoint is encouraging since, if one adopts the basic premise that the ultimate function of teaching is to enable students to acquire certain skills and behaviors, it is logical to conclude that the most relevant criterion of teacher effectiveness is student performance.

[3] Putting Research into Educational Practice (PREP.)

While several researchers (e.g., Morsh and Wilder, 11; Ryans, 2; Ornstein, 1) have acknowledged the merit of student accomplishment as a criterion measure of teacher behavior, they have also noted its disadvantages. Among other factors, student performance (or, more accurately, student *gain*) is not an uncontaminated measure of teacher behavior. Other factors beyond teaching (e.g., student motivation, intelligence, interest, aptitude, and previous course experience) may influence the extent of change in students, thereby clouding the teacher effects. This is especially true, of course, in instructional situations where students are expected to change in many ways—not solely in terms of subject-matter achievement. In these situations, the use of student gains as a criterion becomes defensible only when careful controls have been instituted.

Even with these obstacles, the use of student performance to evaluate teacher effectiveness has much to recommend it. Ryans (2, p. 46) concludes that pupil change is possibly a provocative way to assess teacher behaviors, if the control problem can be satisfactorily handled. That it has particular merit when the focus of the instruction is on technical training is clearly the view of Morsh and Wilder (11, p. 54). After recognizing that student change in subject matter, alone, may be only a small part of an instructor's total effectiveness, they conclude: "This objection probably applies less or may not be applicable at all to the Air Force situation, in which the instructor's chief concern is the teaching of course material of a technical nature." These authors concede that other criteria have been or may be employed (e.g., administrative ratings, peer ratings, student ratings, and self ratings), but they conclude that, even with all its shortcomings, "student gains" appears to be the best criterion.

The pupil achievement criterion elicits no real objection from researchers and teachers. *Improving Teaching Effectiveness: PREP 25* (12) reviews the roles of several variables and then, in summarizing studies, cites as criteria of effectiveness student performance with respect to (a) a factual examination, (b) higher-level retention and thinking, and (c) attitude and motivation. In his handbook on teaching, Gage (13, p. 117) acknowledges pupil achievement to be the ultimate criterion. Countless others agree. It would seem that the remaining problem is that of establishing the relationship between selected teacher behaviors and student performance.

The difficulty, however, is that learner behavior and teacher behavior tend to have a near-zero or chance relationship (Harsh, 14). Among the factors that may account for this situation are:

(1) The large number of teacher behaviors that can be analyzed and assessed.
(2) Different or undefined concepts of criteria for effective teaching.
(3) Lack of agreement on a common method for evaluating teacher behaviors.
(4) Lack of definition and control of other factors that affect the outcomes of teaching.
(5) Lack of agreement on methods for categorizing teacher behaviors.
(6) The general vagueness of teacher behavior categories.

The result is that, in the main, correlations between teacher behaviors (traits, personality characteristics, etc.) and student performance not only are inconsistent from one study to another, but also are lacking in psychological and educational meaning (Gage, 13, p. 118).

Perhaps the underlying reason for this finding is simply that traits, attitudes, and other personality characteristics are only *inferences* or generalizations made by an observer—they are "behaviors" that are not the result of direct observations. For example, the observer may gather certain information about the teacher (performance on personality tests, affect exhibited while interacting with students, amount of classroom disorder tolerated, apparent knowledge and interest in subject matter, etc.), and then impute selected attributes to him. The same attribute might be ascribed to different teachers on the basis of somewhat different behaviors. The result is that, across observers, there is often considerable unreliability in judgments. It is not surprising, therefore, that little headway has been made in relating student performance and teacher traits.

RATIONALE OF THE MODEL

In light of these circumstances, instead of considering these kinds of characteristics of teacher performance, a more fruitful solution might be to limit the classes of teacher behaviors to be considered. Thus, on a logical basis, one might *exclude* such teacher variables as attitudes, interests, abilities, personality characteristics, age, sex, training background, and performance during training. Also, because of no significant relationship with student performance, non-teacher variables such as environmental factors (school size, location, equipment, etc.) could be eliminated.

Note that these exclusions would *not* eliminate classroom teacher variables. These variables are directly related to the present model of teacher functions.

The rationales that underlay the development of the model are first stated briefly and then discussed in more detail:

(1) Regardless of the type of instruction planned, the most effective procedure by which to design and conduct instruction involves *application of systems engineering techniques.* Adoption of this point of view means that the model should require the instructor to be able to perform, with the assistance and support of other instructional team members, each of the steps of the system development cycle. While these steps vary from one authority to another, the following are representative of the instructional systems concept:

- Determine existence of instructional need.
- Perform a system analysis.
- Determine performance requirements.
- Evaluate capabilities of entering students.
- Specify instructional objectives in behavioral terms.
- Arrange terminal and enabling objectives in groups.
- Implement effective learning activities for objectives.
- Implement appropriate learning management procedures.

CONARC Regulation 350-100-1[4] is a relevant source of information and guidance with respect to the systems concept.

(2) A behavioristic approach that attributes student learning and performance primarily to *conditions and events in the classroom* was adopted. This does not deny the contributions of student intelligence, aptitudes, and personality characteristics. However, it is believed that classroom events can circumvent (or enhance) the effects of these characteristics under many, if not most, circumstances, and that instruction focuses on the student's *environment*, not on his traits. This seems appropriate for, while one cannot establish traits, one can confidently manipulate and control a student's environment.

(3) Classroom events that have the greatest impact on student performance are (a) those associated with the generation and presentation of instruction, and (b) those inherent in the interaction between the instructor and the student. From this point of view, the instructional *content* and the *instructor* assume unique importance.

(4) Because the instructor is the prime point of contact between the content and the student, it is maintained that the *instructor's role in the instructional process* is particularly critical. To the extent that he can perform his assigned functions, student learning and performance are likely to be adequate.

[4] Continental Army Command. *Systems Engineering of Training (Course Design)*, CONARC Regulation 350-100-1, 1968.

INSTRUCTION AS A SYSTEM

A system may be defined as a group of components that are organized and integrated to achieve a given purpose or mission. Systems can be grand in size, such as an air defense system, or small, such as a one-man infantry system where the only components may be a soldier, his rifle, and a single target. Because the degree of control (dominance, primacy) exerted by man and "machine" in achieving a system mission vary from one system to another, the phrases *man-ascendant* and *machine-ascendant* are sometimes used. To emphasize the "organic" nature of systems, they are commonly described as interactive, dynamic, and self-regulatory (i.e., characterized by frequent feedback loops).

An instructional system has as its mission or primary goal the providing of skilled manpower that will serve the needs of a segment of society. An instructional system may consist of only one student and one teacher, or there may be thousands of students, hundreds of teachers, textbooks, special media and devices, many different instructional support personnel, and administrators. In the former case, all the functions of the system are performed by the one teacher, and in the latter, different functions are performed by different individuals. The functions that a particular teacher is required to perform will depend, to a large extent, upon the size and character of the instructional system of which he is a part. In an extensive system, an individual may begin his career as a teacher charged with performing certain system functions, but as his career progresses, he may become an administrator charged with performing different functions. Since teacher functions vary from one setting to another, it seems most useful to identify the functions that must be accomplished by all instructional systems, regardless of how these functions might be assigned within an institution.

Instructional systems exist to serve the needs of various segments of society or of society in general. Instructional institutions that do not serve such needs with sufficient success to justify their cost often lose their financial support or are unable to attract sufficient numbers of students, or both. Hence, an early function of an existing or proposed instructional system is the identification of those segments of society that it serves, and the determination of the needs of each segment for skilled individuals.

Instructional needs may arise either from deficiencies in the fulfillment of existing requirements or from totally new requirements for skilled individuals. The early symptoms of such needs may be casual rumors or vague expressions of discontent from the users of the graduates, from the graduates themselves, from students still in the instructional program, or from other segments of the society, such as research and engineering fields. It should be noted that one user of the graduates from one part of an instructional system may be another part of that same system.

Once the need for individuals possessing certain skills has been determined, those skills must be identified with sufficient precision to provide an adequate basis for designing effective and efficient instructional procedures. Information about instructional needs rarely comes to the institution in the form of precisely defined skills; they are derived from the situations in which graduates will perform.

Students graduate from the instructional system to become part of some other system (or segment of society), such as an industrial system, a governmental system, a law enforcement system, or another instructional system. The system for which the student is trained is designated as the *target* system, the instructional system as the *delivery* system. The delivery system develops individuals who are capable of performing

the functions of the target system. Hence, the design of the delivery system must begin with an analysis of the target system.[5]

The functions to be accomplished by graduates of the instructional system, the situations in which those functions are to be performed, and the criteria of successful performance are identified by analyzing the target system and the positions in it. This analysis enables the accomplishment of several functions of the delivery system, one of the most important being to specify terminal performance objectives for the instructional program to be developed.

A sequence of learning environments and experiences that will cause students to acquire the performance capabilities specified by the terminal objectives must then be developed. The elements include such things as textbooks, practice exercises, instructional aids and devices, teacher activities, tests and testing practices, media, and progression strategies.

Simply having a sequence of learning activities does not guarantee that students will learn. Other treatments may be needed to cause students to interact effectively with the instructional material or to prevent them from avoiding the learning situation. That is, treatments that will motivate students to learn and continue to learn may need to be applied. This function is acknowledged to be important and is provided for in the model.

A secondary goal of an instructional system is one it shares with all other operational systems—it must function in an efficient and effective manner. This involves accomplishing at least two other broad functions. First, procedures must be developed that maximize productivity and integration of the various activities in consonance with the system's overall goals and minimize rivalry and discord among these activities. Second, the system and individuals in it must be kept current with the state of the art of the various technologies used.

While no attempt has been made to relate the several functions already cited to the list of steps that comprise the system development cycle, there is a definite parallelism. The model to be presented later will make this relationship more obvious.

INSTRUCTIONAL CONTENT, INSTRUCTOR, AND STUDENT

Two important categories of classroom teacher behavior[6] may be identified. One is focused on the activities engaged in by the instructor while he is *preparing for instruction*; the other is focused on the activities and events that occur while actually *presenting instruction*. Since the former places emphasis on relationships between the instructor and the subject matter or instructional content, it may be referred to as a *teacher-content interaction*. The second category, placing emphasis on relationships between the instructor and the student, may be referred to as a *teacher-pupil interaction*.

In a strict sense, of course, most of the teacher-content interaction actually occurs outside the classroom and is associated with preparation of instruction. However, because the immediate target of the interaction is the classroom, it is reasonable to view it as a pertinent category of classroom teacher behavior. Certainly this kind of teacher behavior portends a more obvious relationship with student performance than do teacher characteristics such as interests, attitudes, and age.

[5]The delivery system itself may also be analyzed as a preliminary step toward designing it or improving its operation. It is important, therefore, to distinguish between an analysis of the target system and an analysis of the delivery system, which have vastly different sets of concerns. The target system is analyzed so as to define the criterion of instruction. The delivery system is analyzed to develop instructional procedures capable of producing students who meet that criterion.

[6]Two phrases used in the educational literature—"teacher classroom behavior" and "classroom teacher behavior"—are interpreted as being identical in meaning.

There is straightforward justification for including in the model those teacher behaviors directly associated with generation of instruction. If one is designing instruction according to principles of systems engineering, then determining performance requirements, stating instructional objectives, selecting instructional content, and developing learning experiences are highly relevant and necessary activities. The presentation of instruction in the classroom is an end-step in a series—all directed at arranging an environment and a set of learner activities that will help the student acquire specific knowledges and skills. Thus, the ability of the instructor to perform the several steps of instructional design is highly significant. If he fails to establish satisfactory performance requirements or valid instructional objectives, or otherwise neglects a step in the design process, student performance must necessarily suffer. In substance, then, the teacher-content interaction is deemed to be extremely important.

The teacher-pupil interaction has been studied by many educational researchers, including, for example, assessments of the impact on students of classroom behaviors (traits) of teachers (Ryans, 2; Medley and Mitzel, 15). But, as noted earlier, the trait approach has tended not to be productive. The present interest in teacher-pupil interaction does not represent a duplication of this earlier negative approach. On the contrary, instead of looking at the *trait* components of teacher classroom behaviors, the present interest is in specific *techniques* teachers may use in managing the learning of students. It is believed that this represents a much different and potentially more fruitful kind of teacher-pupil interaction.

All programs of instruction must include effective techniques for managing students and for motivating them to learn. Great promise in this regard has been shown by techniques called *contingency management* (or behavior modification). The educational and training literature is replete with articles citing the usefulness of such techniques.[7]

Contingency management (CM) represents an application of principles of operant conditioning to the classroom. The basic premise of operant conditioning is that the likelihood of a given behavior depends on its consequence. Behaviors that are followed by satisfying or rewarding events are more likely to recur than behaviors that are followed by unsatisfactory or nonrewarding events. To use contingency management, then, the instructor must (a) specify what student behavior is appropriate, (b) ascertain the kinds of stimuli that are reinforcing or rewarding to the student, and (c) arrange classroom events so that he can administer the reinforcing stimuli contingent upon appearance in the student of the appropriate behavior.

Contingency management may be viewed as a set of techniques that the instructor can use to strengthen appropriate student behavior and to weaken inappropriate behavior. It is not concerned with motives, needs, or attitudes of students, but only with the behavior students exhibit in the classroom. Thus, in managing students, the instructor seeks to strengthen appropriate behaviors by reinforcing or rewarding them, and to weaken inappropriate behaviors by extinguishing or punishing them.

Four specific reinforcement techniques available to the instructor are defined and illustrated below:

(1) A *positive reinforcer* is a stimulus that, when presented following a response, strengthens the response. In a typical classroom situation, the instructor may ascertain the extent of student learning by posing questions of substance. When a student responds correctly, the instructor may attempt to reinforce this response by saying "Good!" "Right!" and so forth. This stimulus event—saying "Good" or "Right"—constitutes a simple example of a positive reinforcer. It was presented contingent upon the occurrence of a correct response from a student.

[7] For example, see References 16, 17, 18, 19, 20, and 21. For a discussion of the possible application of contingency management techniques in the Army, see 22.

Categories of potential positive reinforcers noted in the educational literature include:

- Consumable reinforcers (e.g., candy).
- Material reinforcers (e.g., books).
- Activity reinforcers (e.g., the opportunity to engage in desirable activities, such as attending a movie).
- Symbolic reinforcers (e.g., points or tokens that may be exchanged later for consumable, material, or activity reinforcers).
- Teacher or supervisor approval.
- Peer approval.
- Independence (e.g., increased participation by student in selecting and scheduling his own learning activities).
- Success (e.g., learning progress).

(2) A *negative reinforcer* is an aversive (undesirable) stimulus that, when removed following a response, strengthens the response. A common example would be that of keeping a student after instruction until he completed an assignment. A less obvious example would be to torture a person and not release him until he responded by "confessing." In both cases, performing a desired behavior (completing the assignment, confessing) was followed by cessation of the undesirable stimulus situation.

(3) A *punisher* is an aversive (undesirable) stimulus that, when presented following a response, weakens the response. When a student responds incorrectly to a question posed by the instructor, the instructor may punish the student's response by saying "No! No! That's not right." By these stimulus events—words—the instructor hopes to weaken the response given by the student.

Examples of punishers in a school environment include:

- Teacher disapproval (e.g., scolding, frowning, criticism).
- Peer disapproval (e.g., being excluded from activities).
- Confinement (e.g., not permitted regular free time).
- Failure (e.g., lack of learning progress).

(4) *Extinction* is the withholding of previous reinforcers for a response; in other words, a response that previously had been reinforced no longer receives reinforcement. For example, a student may engage in unproductive classroom behaviors, such as "fails to complete reading assignments," "engages the instructor in lengthy debates over insignificant matters," and "gives inadequate answers each time the instructor poses a question." If the instructor responds to such behaviors by giving the student much attention, the *attention* itself may become an effective reinforcer, increasing the probability that the student will continue these kinds of behaviors. To extinguish them, the instructor must withdraw the reinforcement. Thus, each time the student "misbehaves" in this manner, the instructor ignores him. If the instructor responds consistently, these behaviors may in time weaken and disappear.

The use of punishment or extinction to eliminate undesired student behaviors tends to be more effective if used in conjunction with positive reinforcement. In the example, it is likely that the instructor would be more successful in eliminating unproductive behavior if, in addition to ignoring these behaviors, he also consistently reinforced (positively) productive classroom behaviors.

In any event, it is believed by the research staff that contingency management techniques constitute important and useful skills, and that they should be part of the repertory of the master instructor.

THE INSTRUCTOR AS A SYSTEM COMPONENT

In addition to the two categories of classroom teacher behavior described, the present effort encompasses two other types of teacher behavior that tend to occur outside the classroom. Since, as for the teacher-content interaction previously discussed, the locus of their impact is in the classroom, they are included with the other categories of classroom behavior.

The first of these additional behaviors deals with teacher activities in *promoting professional growth*. The second is associated with *testing innovative educational practices*. That these activities are important functions and should be included in the model may be defended best, perhaps, by describing briefly the unique role of the instructor in the system.

The instructor constitutes a highly significant component of an instructional system; in his functions of designing and presenting instruction, plus managing and motivating students, he is a potent source of influence in student learning. Because the instructor is the prime point of contact between the student and the instructional content, the skill with which he effects this "meeting" is unmistakably important. Even though much of the instruction may be accomplished with the aid of "machines" (projectors, tapes, textbooks, etc.), there is little doubt that most instructional systems should be viewed as man-ascendant.

The implications for the instructor are clear. He must be ingenious, creative, inventive, and alert to new approaches. He must be willing to explore previously untried procedures, and, should he find them useful, be ready to defend them to his peers or superiors. If he is to support teaching as a profession, he must perform in a professional manner, seeking continued growth, maturity, insight, and understanding in himself, and showing these characteristics in his classroom.

The activities and behaviors the instructor needs to engage in when attempting to acquire these laudable characteristics may not be immediately obvious. Therefore, the intent in the model is to provide descriptions that are behavioral and concrete, constituting or reflecting efforts to grow professionally or to undertake innovative practices.

THE MODEL

Two general comments should be made about the model. First, it does not list many of the activities and behaviors on which Army instructors are typically rated, such as instructor appearance, voice quality, appearance of classroom, use of training aids, and organization of class. Their exclusion implies that their impact on student learning is viewed as secondary rather than primary. It is expected that the military instructor would evidence physical, intellectual, and attitudinal attributes that reflect favorably upon the military. He should monitor and adjust the classroom ventilation, arrange student desks in a pattern that facilitates instruction, use audio-visual devices skillfully, and so forth. He should be able to speak audibly, enunciate correctly, show forcefulness and enthusiasm, gesture meaningfully, and so forth. But, since it is questionable that these capabilities are dominant factors in student learning and performance, they have not been addressed in the present model. Schools will probably wish to continue to evaluate these areas of instructor performance, and they are encouraged to do so, but it is suggested that such factors be treated separately from the kinds of instructor performance described in the model.

Second, with respect to form or style, it was assumed that a model stated in the form of instructor performance objectives would have considerable merit. Among other things, it would represent a natural extension of student performance objectives, a

concept already familiar to Army school personnel. Most importantly, it would have the virtue of emphasizing the behavioral nature of the model. Thus, instead of listing traits and personality characteristics, the model lists specific instructor behaviors.

The model lists four Areas of Performance with several functions and tasks cited for each area, as follows:

I. Training Programs. Development and implementation of training programs that maximize student acquisition of required knowledge and skills.

II. Instructor Classroom Behaviors. Design and implementation of practices that facilitate learning and weaken those student behaviors that interfere with learning.

III. Professional Growth. Planning and implementation of a program of professional growth for self and other instructors.

IV. Innovative Practices. Examination and planning for a test of innovative practices in the classroom.

For convenience, the areas of performance were divided into specific functions before statements of tasks were prepared. As might be expected, the amount of detail available to describe functions and tasks varied. While no consistent comparability is implied across alphanumeric designations, those performance statements headed by Arabic numerals describe, in general, the level of behavior of greatest interest.

It should not be implied that the functions and tasks listed under the first area of performance must be performed by the master instructor working in isolation, that is, independently. On the contrary, it is probably desirable that not all instructors perform all functions but rather that they pool their skills and divide the work. In addition, of course, it is likely that some of these functions (specially "Determine existence of instructional need," and "Evaluate capabilities of entering students,") will sometimes be performed by higher authority and are not within the routine scope of the master instructor. Thus, there is no expectation that the master instructor will always perform these functions.

Area I: Training Programs—*Development and implementation of training programs that maximize student acquisition of required knowledge and skills.*

A. Determine the existence of an instructional need.

1. Given empirical or anecdotal evidence of a performance discrepancy in an existing system, analyze the discrepancy from the point of view of the usefulness of or need for formal instruction. As a minimum, the instructor should be able to define the extent of the discrepancy, recommend possible ways to overcome it, and plan appropriate action to prevent its recurrence.

2. Given the existence of a new system, new equipment for a system, new command responsibilities, or some comparable event, determine the probability that a need for formal instruction exists. The instructor should make a preliminary analysis of skills likely to be needed in the new situation and compare them with existing skills.

B. Perform a system analysis.

1. Given an existing system with a designated performance discrepancy and a command decision to generate instruction to remove the discrepancy, analyze the system, placing primary emphasis upon the delineation of functions that require human performance.

2. Given a newly generated system in which individuals must be trained to perform, analyze the system. The analysis should identify important system components, functions, environments, and constraints.

C. Determine performancy requirements.

1. Given the results of a system analysis, including the preliminary enumeration of functions to be performed by man, develop a set of tentative performance requirements. The requirements should state the knowledge and skills demanded of man if he is to perform effectively in the system.

2. Given a set of tentative performance requirements and access to appropriate system literature, doctrine, personnel, and other relevant sources of system information, substantiate the performance requirements.

D. Evaluate capabilities of entering students.

1. Based upon information about anticipated performance requirements, devise test items that will assess the present capabilities of students who are to enter the intended training. The test may include aptitude, knowledge, and skill items. Items may be taken directly from a previously prepared final performance examination if such is available and appropriate.

2. Administer the assessment test to students who are scheduled to enter the training program.

3. Evaluate the results of the assessment test in light of the anticipated performance requirements.

E. Specify instructional objectives in behavioral terms.

1. Using the statements of performance requirements as guides, and taking into account the existing capabilities of entering students, prepare a list of *terminal* instructional objectives. These objectives should constitute the performance goals of a course of instruction that will enable students to meet the desired performance requirements. Each objective should contain, as a minimum, a statement of the specific student action, an indication of important performance conditions, and a description of the level of acceptable student performance.

2. For each terminal instructional objective, prepare a set of enabling objectives to make possible the achievement of the terminal objectives. Enabling objectives should be written to the level of the minimally prepared student. To ensure this, the instructor should perform the following steps:

a. Prepare a draft set of directions for performing the behavioral acts specified by each enabling objective at a level of detail and language believed to be appropriate for minimally prepared students. Initial effort should be placed on those objectives that have been most difficult to attain.

b. Test the accuracy of the draft set of directions by submitting them to other instructors for review.

c. Test each set of directions with one minimally prepared student at a time. Revision of directions should continue until they are effective in eliciting proper performance from such students.

d. Formulate significant directions for each set of enabling objectives, paying particular attention to organized information to be stored in memory and perceptual-motor skills not possessed by minimally prepared students.

F. Arrange both terminal and enabling instructional objectives into appropriate groups and orders.

1. Arrange the terminal objectives into primary groups in terms of common enabling objectives, that is, in terms of common information pools, common perceptual-motor skills, and similar sets of directions. This may be done most readily by arranging terminal objectives along one edge of a matrix, enabling objectives along the other edge, placing "Xs" in the appropriate squares. Primary groups of terminal objectives are those that share few, if any, enabling objectives with other groups. Further analysis of primary groups can be performed by instructors working together.

2. Arrange the terminal objectives in each primary group in order of learning difficulty.

a. Make estimates about the learning difficulty of each enabling objective in the primary group—"easy," "moderate," and "difficult" should be sufficient.

b. Select as the first terminal objective to be attained the one that subsumes the fewest, easiest, and most common enabling objectives and proceed in this manner until all enabling objectives have been placed in an order. It is not necessary to place each one into a precise point, but only into order categories.

G. Implement effective learning activities for each objective in each primary group.

1. Identify each objective as being principally concerned with one of the following learning functions:

a. Information retrieval.

b. Perceptual-motor skill.

c. Complex performance.

2. Develop an instructional strategy for each objective.

a. Strategies for information retrieval objectives should allow the student practice in randomly presented information retrieval events with immediate feedback. Flashcards are an example. The student may also be provided with memory aids to prompt retrieval in some or all events. Preferably, memory aids should be on a demand schedule, presented only at the student's request. This may require that students work in coach-pupil pairs in lieu of using special machines or devices.

b. Strategies for perceptual-motor skill objectives will vary depending upon the particular kind of skill involved. Regardless of the details of any particular strategy, all of them should provide each student with many opportunities in which to practice the skill under conditions of prompting on demand and immediate feedback. Again, it may be most economical and effective to arrange students in coach-pupil pairs working with specially designed materials.

c. Strategies for complex performance objectives should provide the student with prompting on demand for each step or group of steps in the procedure. Directions for all except very short procedures should include a multi-level outline as a memory aid. In many instances, early learning can be concerned solely with acquisition of the verbal directions without actual practice of the performance. In this manner, the student can provide his own directions during later learning.

H. Implement appropriate learning management procedures.

1. Develop evaluation procedures that will assess and evaluate the student's progress through the instructional program. As a minimum, the instructor should prepare a number of test items for each objective, assembling the items into at least two alternate test forms for groups of objectives.

2. Develop a record-keeping system that will display the progress of each student. The system should indicate which objectives have been attained by mastery progression tests and which have not.

3. Detect and correct progression difficulties in instructional materials. Progression difficulties are indicated when a large number of students fail a progression mastery test on the first time through the instructional materials for that test, or when some students, who fail on the first try, recycle again and again without significant improvement.

Area II: Instructor Classroom Behaviors—*Design and implementation of practices that facilitate learning and weaken those student behaviors that interfere with learning.*

A. Implement a classroom environment that minimizes the occurrence of aversive stimulation.

1. Given a classroom situation typical of the instructor's experience, the instructor should list the possible aversive conditions that could exist in the classroom. Aversive conditions may result from instructor behavior, student behavior, or some situation within the school system. The instructor may ask the students to prepare a list of conditions that they think are aversive.

2. Given a list of aversive conditions, the instructor should identify those that actually exist in his classroom. The instructor may seek the assistance of his supervisor, the students, other instructors, and so forth in identifying the conditions.

3. Given a list of aversive conditions that actually exist in his classroom, the instructor should, with the aid of students, prepare a set of classroom rules that will aid in minimizing them. The instructor may also seek the assistance of his supervisor in preparing classroom rules. The instructor should plan his instruction around aversive conditions that cannot be eliminated.

B. Implement a reinforcing environment in the classroom that will strengthen (or elicit) appropriate student learning behaviors.

1. Given a schedule of a training program, the instructor should prepare a list of student activities, defined in behavioral terms, that facilitate learning. Suggested general categories of behavior that facilitate learning are:

a. Orientation, which involves getting students in contact with instructional materials and keeping them in contact for sufficient periods of time. The term instructional materials includes verbal as well as printed materials.

b. Attendance, which refers to students' presence in the classroom or attendance at special school activities.

c. Lesson completion, which refers to the completion of assigned work, either in the classroom or away from the classroom.

2. Given the list of student behaviors that facilitate learning, the instructor should implement the general contingency management (CM) procedures to elicit and maintain such behaviors. In using the general CM procedures, the instructor should use social reinforcement (approval, praise, success in learning) and should ignore inappropriate behaviors. When reinforcing students, the instructor should minimize inadvertent reinforcement of inappropriate behavior.

C. Design and implement a monitoring system to be used in identifying students who do not respond to the general CM procedures with appropriate learning behaviors.

1. Given a classroom environment that reinforces appropriate learning behaviors, the instructor should maintain a general observation of student behavior for the purpose of identifying inappropriate individual or group behaviors.

2. Given an indication of the need of a formal CM program, the instructor should develop techniques for formal observation of individual or group behaviors. A behavioral statement of the inappropriate behavior should be prepared by the instructor. An observation schedule should be prepared providing for specific periods of observing and recording the occurrence of the inappropriate behaviors. Record forms must be modified or developed for recording data during the observation periods.

3. Given the schedule for observing a specific inappropriate behavior and a set of record forms, the instructor (or class assistant) should observe and record the occurrence of the inappropriate behavior for five to ten days. At the end of the

observation schedule, the instructor will summarize the recorded data and determine if the inappropriate behavior occurs often enough to present a real problem—interfering with the learning process.

4. Given data to indicate that a specific inappropriate behavior presents a problem, the instructor should seek to identify the aspect of the environment that is maintaining the inappropriate behavior. This task will result in the decision that there is or is not a need for a formal CM program for changing the behavior.

D. Develop and implement a formal CM program for strengthening appropriate learning behaviors and extinguishing inappropriate learning behaviors.

1. Given a behavioral statement of an inappropriate behavior to be eliminated, an appropriate behavior to be elicited and strengthened, and the environmental element that is maintaining the inappropriate behavior, the instructor should prepare a statement of a strategy to be used for modifying the behavior. The complete statement of the strategy will include:

a. A list of reinforcers developed in consultation with the student and with his classmates.

b. A set of instructions to be given to the student and class as an explanation of the CM program.

c. Examples of the forms to be used in recording the observation data, along with graphs to be used in analyzing the progress of the program.

d. A schedule for observing behavior and administrating reinforcers.

2. Given the complete statement of a CM program for modifying a specific classroom behavior, the instructor should implement the program in the classroom.

Area III: Professional Growth—*Planning and implementation of a program of professional growth for self and other instructors.*[8]

A. Identify areas for personal improvement.

1. At staff meetings, informal staff gatherings, and on other occasions when instructors might congregate, the instructor should facilitate discussions related to professional growth. For example, he should be prepared to recommend possible activities, as well as to react constructively to ideas about professional growth as proposed by others. The instructor should not make unfair or unwarranted criticisms of the suggestions of other instructors, but should seek to provide positive, solution-oriented comments. Also, the instructor should encourage and reinforce attempts by others to provide comments.

[8] In the final two areas, to clarify the meaning of certain action verbs or other concepts, the following definitions or alternate terms are provided:

Professional growth—development, advancement, improvement, betterment; an increase in capability as an instructor
Innovative educational practice—novel, new, promising educational practice
Facilitate—assist, aid, help, promote
Review—examine, study, comment upon
Determine—judge, decide
Read—study, review
Atend—be present at
Select—choose, pick out
Seek—solicit, request, ask for
Try out—test, make a trial use of
Reinforce—strengthen, "reward," acknowledge the worth of

2. From discussions with his supervisor, and with his assistance, the instructor should determine areas where his teaching performance is weak and where personal improvement might be desirable.

B. Determine possible courses of action to bring about improvement in professional capabilities.

1. Given access to selected professional journals and/or magazines, the instructor should routinely read (or scan) such publications for the purpose of acquiring information and suggested actions one might take with respect to improving professional capabilities. The instructor should be prepared to report to fellow instructors concerning actions described or recommended in the publications.

2. When feasible in terms of teaching load, location, and cost, the instructor should attend conferences, symposia, and workshops that are focused on professional problems of interest to instructors. The instructor should be prepared to report to fellow instructors any problems and recommendations that might emanate from such conferences.

C. Encourage personal improvement efforts by other instructors.

1. In all types of situations where instructors may engage in discussions focused on professional growth, the instructor should consistently reinforce the efforts of other instructors to suggest positive ways to improve their teaching. As convenient and appropriate, the instructor should publicly acknowledge the merit of suggestions of other instructors, or otherwise show support.

2. When requested by a fellow instructor to review his products (lesson plans, objectives, test items, etc.), the instructor should reinforce efforts to produce quality instructional materials and to employ effective practices in teaching. As convenient and appropriate, the instructor should publicly acknowledge the merit of others' products and practices in the presence of other instructors, the fellow instructor, supervisors, department heads, and so forth.

Area IV: Innovative Practices—*Examination and planning for a test of innovative practices in the classroom.*

A. Identify and select feasible innovative training practices.

1. When feasible in terms of teaching load, location, and cost, the instructor should attend conferences, symposia, and workshops that are devoted to discussion and/or evaluation of innovative training practices. The instructor should be prepared to report to fellow instructors regarding the status of such practices and to defend any recommendation he might make that such practices be instituted in his department.

2. The instructor should routinely read (or scan) reports, articles, and books that describe and recommend innovative training practices. The instructor should be prepared to report to fellow instructors regarding his understanding of the status of such practices, and should be able to defend any recommendation he might make that such practices should be instituted in his department.

B. Arrange for test and evaluation of selected innovative practices.

1. After attending conferences or after reading literature recommending given innovative practices, the instructor should be able to select a new educational practice for trial implementation in his classroom. The instructor should be prepared to defend his selection of an innovative practice to implement.

2. After having selected a given innovative practice to implement in his classroom, the instructor should seek support and approval of his supervisor and other administrative officials for its trial use. To improve his chances of obtaining approval, the instructor should carefully document the evidence in favor of the new training practice and be prepared to defend his selection.

3. After receiving approval and support, the instructor should be able to try out a new training practice. The instructor should use controls as appropriate to provide for a valid evaluation of its effects.

IMPLICATIONS OF THE MODEL

In an early section of this report, two separate, but related, purposes of the model were stated. One purpose was that it should provide guidance in the development of procedures and materials to be used in *training* Army instructors. A related purpose focused on the use of the model in *evaluating* the performance of instructors. It is believed that the model can assist in achieving both purposes.

In undertaking the present research, it was not planned to include in this first report an explicit and detailed discussion of procedures that might be followed in implementing the model. That aspect of the exploratory effort was scheduled for attention at a later time. However, because it is believed that the model has particular implications for evaluating the performance of instructors, some suggestions in that regard follow.

If one is willing at the outset to accept the premise that the model provides a realistic if not comprehensive description of at least one cluster of desired instructor behaviors, then one should be able to use it *directly* in specifying the kinds of information an observer needs so that he can make a valid and timely evaluation of the performance of an instructor. From a pragmatic point of view, one needs to reduce the statements of instructor performance objectives into a simple form that is convenient for gathering and recording the necessary data, as well as for cueing the observer—that is, guiding his observations.

As was noted in the introduction to the section on the model, those performance statements headed by Arabic numerals constitute the behaviors of the greatest interest. This level of statement, then, should receive the most attention when a system for obtaining pertinent performance data is being arranged.

It should be mentioned that evidence of attainment of some of the instructor behaviors included in the model may depend primarily on observations made at some place and time other than during instruction. Take, for example, the requirement that the instructor should "prepare terminal objectives." While observation in the classroom might permit fairly accurate inferences of the extent to which the instructor had performed this requirement, a far better source of information would be the instructional materials he had prepared prior to entering the classroom—that is, if an instructor has prepared such objectives, they should be a part of the lesson materials. Evidence of attainment would then be based on direct information rather than inference.

In a manner similar to that currently used by several Army schools, Figure 1 presents a simple form on which an observer may record the extent of attainment by an instructor of the performance requirements specified in the model. Beyond the listing of performance criteria, the form is intentionally left unstructured; it is intended that the observer may, under "Date and Comments," note not only the attainment or lack of attainment of a criterion, but also the nature of the evidence that was used. While the form as shown in Figure 1 does not contain space for making comments, spacing on the actual form would provide as much space as seemed convenient. The form could also provide for other information that might be needed for administrative purposes.

Instructor Observation Form *(Sample)*

Observer: _____ Instructor: _____ Course _____

TRAINING PROGRAM — Date and Comments

A. Determine instructional need
   Analyze performance discrepancy _____
   Determine formal instruction need _____

B. Perform system analysis
   Analyze existing system _____
   Analyze new system _____

C. Determine performance requirements
   Develop tentative requirements _____
   Substantiate requirements _____

D. Evaluate capabilities of entering students
   Devise test items _____
   Administer assessment test _____
   Evaluate assessment test _____

E. Specify objectives in behavioral terms
   Prepare terminal objectives (TOs) _____
   Prepare enabling objectives (EOs) _____

F. Arrange TOs and EOs
   Arrange TOs in groups _____
   Arrange TOs by learning difficulty _____

G. Implement learning activities
   Identify learning functions _____
   Develop instructional strategy _____

H. Implement management practices
   Develop evaluation procedures _____
   Develop record-keeping system _____

INSTRUCTOR CLASSROOM BEHAVIORS

A. Implement non-aversive classroom environment _____
   List possible aversive conditions _____
   Identify actual aversive conditions _____
   Prepare classroom rules _____

B. Implement reinforcing environment in classroom
   Define facilitative activities _____
   Implement general CM procedures _____

Figure 1 *(Continued)*

Instructor Observation Form *(Sample) (Continued)*

INSTRUCTOR CLASSROOM BEHAVIORS (Continued) Date and Comments

C. Design and implement a monitoring system
- Observe student behavior _____
- Develop formal observation techniques _____
- Record inappropriate student behavior _____
- Identify environmental reinforcers _____

D. Develop and implement formal CM program
- Prepare strategy statement _____
- Implement formal CM program _____

PROFESSIONAL GROWTH

A. Identify areas for personal improvement
- Facilitate discussion _____
- Determine weak areas _____

B. Determine courses of action
- Read publications _____
- Attend conferences _____

C. Encourage improvement in others
- Reinforce teacher efforts _____
- Reinforce teacher products _____

INNOVATIVE PRACTICES

A. Identify feasible innovative practices
- Attend conferences _____
- Read books, reports _____

B. Test innovative practices
- Select practices to test _____
- Seek administrative support _____
- Try out new practices _____

Figure 1

LITERATURE CITED
AND
APPENDIX

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Appendix A

U.S. ARMY SCHOOLS THAT SENT EVALUATION MATERIALS

U.S. Army Adjutant General School
U.S. Army Air Defense School
U.S. Army Armor School
U.S. Army Aviation School
U.S. Army Chaplain School
U.S. Army Chemical Center and School
U.S. Army Combat Surveillance and EW School
U.S. Army Command and General Staff College
(Does not formally evaluate instructors; therefore, it was not included in Table 1)
U.S. Army Engineer School
U.S. Army Field Artillery School
U.S. Army Infantry School
U.S. Army Intelligence Center and School
U.S. Army Military Police School
U.S. Army Ordnance Center and School
U.S. Army Quartermaster School
U.S. Army Signal Center and School
U.S. Army Southeastern Signal School
U.S. Army Transportation School
U.S. Women's Army Corps School

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13. ABSTRACT

After completing a search of educational and training literature, and reviewing practices and criteria employed by Army schools in evaluating instructors, a model of the functions of a master instructor was developed. Based upon two main rationales (systems engineering and a behavioristic concept of learning), the model encompassed four areas of performance. The areas were apportioned into 17 functions and 40 tasks. Task statements were phrased in the form of instructor performance objectives. The model can provide guidance in the development of prototype procedures and materials for the training of instructors, and it can aid in devising procedures and forms for the evaluation of instructors.

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Contingency management						
Instructors						
Instructor performance objectives						
Performance evaluation						
Performance objectives						
Systems engineering						
Training of instructors						
Transfer of training						

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3 6TH RGN USARADCOM FT BAKER
1 4TH ARMY MSL COMD AIR TRANSPORTABLE SAN FRAN
1 PERS SUBSYS DIV CREW SUBSYS DRCT AERO SYS DIV WRIGHT-PAT.
1 DIR ARMY RD FOR AVN ACCIDENT RSCH FTRUCKER
2 CO PICATINNY ARSNL DOVER N J ATTN SUMPA VCI
1 LIB DEF SUPPLY AGCY CAMERON STA VA
2 CO USA CDC AG AGCY FT BENJ HARRISON IND
1 REF M MS IS NASA ALA
1 CO USA CBT DEVEL COMD TRANS AGCY FT EUSTIS
1 CO ARMY CDC INF AGY FT BENNING
1 CO ARMY CDC ARMOR AGY FT KNOX
8 USA CDC SPEC WARFARE AGENCY FT BRAGG
1 CO US ARMY CDC AVN AGCY FT RUCKER
1 DIR OF INTERN TNG USA LOG MGT CTR FT LEE
3 CO USA CDC CBT SUPPORT GP FT BELVOIR
3 CO USA TNG CTR (FA) ATTN AKPSITC-TT FT SILL
1 CG USA TNG CTR & FT LEONARD WOOD ATTN ACOFS G3
1 CG USA INF CTR ATTN AJIGT-T FT BENNING
1 CG USA TNG CTR INF ATTN ACOFS G3 FT DIX
1 CG USA TNG CTR ATTN ACOFS G3 FT JACKSON
1 CG USA TNG CTR INF ATTN ACOFS G3 FT LEWIS
1 CG USA TNG CTR INF & FT ORD ATTN ACOFS G3
61 CG USA TNG CTR INF ATTN ACOFS G3 FT POLK
5 CO USA MED TNG CTR ATTN DIR OF TNG FT SAM HOUSTON
20 CG USA AD CTR ATTN G3 FT BLISS
1 CG USA TNG CTR INF ATTN ACOFS G3 FT CAMPBELL
3 LIB ARMY WAR COLL CARLISLE BKS
1 CO USA INTELL SCH ATTN AHBH-S-AO FT HUACHUCA
1 COMDT COMD & GEN STAFF CO FT LEAVENWORTH ATTN ARCHIVES
1 DIR OF MILIT PSYCHOL & LDRSHP US MILIT ACAD WEST POINT
1 US MILIT ACAD WEST POINT ATTN LIB
1 COMDT ARMY AVN SCH ATTN DIR OF INSTR FT RUCKER
2 COMDT ARMY SECUR AGY TNG CTR & SCH FT DEVENS ATTN LIB
1 CUMDT INDSTR COLL OF THE ARMED FORCES FT MCNAIR
2 COMDT NATL WAR COLL FT LESLEY J MCNAIR ATTN CLASSF RECORDS BR LIB
1 STIMSON LIB MED FLD SERV SCH BROOKE ARMY MED CTR FT SAM HOUSTON
10 COMDT THE ARMOR SCH ATTN DOI FT KNOX
1 COMDT ARMY ARMOR SCH FT KNOX ATTN WEAPONS DEPT
1 LIB USA ARMOR SCH FT KNOX
1 COMDT USA CHAPLAIN SCH ATTN DOI FT HAMILTON
1 COMDT ARMY CHEM CORPS SCH FT MCCLELLAN ATTN EDUC ADV
1 COMDT USA FIN SCH ATTN CHF DOC DEV LIT PLN DIV DOOI IND
1 USA FINANCE SCH FT BENJ HARRISON ATTN EDUC ADV
4 COMDT ADJ GEN SCH FT BENJ HARRISON ATTN EDUC ADV
1 COMDT USAIS ATTN EDUC ADV FT BENNING
1 COMDT USAIS ATTN AJIIS-D-EPRO FT BENNING
1 HQ US ARMY ADJ GEN SCH FT BENJ HARRISON ATT COMDT
1 LIB ARMY QM SCH FT LEE
1 COMDT USA QM SCH FT LEE ATTN EDUC ADV
1 COMDT ARMY TRANS SCH FT EUSTIS ATTN EDUC ADV
1 CO USA SEC AGY TNG CTR & SCH ATTN IATEV RSCH ADV FT DEVENS
1 COMDT USA MIL POLICE SCH ATTN PLNS &PROG ODOI FT GORDON
2 COMDT US ARMY SOUTHEASTERN SIG SCH ATTN EDUC ADV FT GORDON
1 COMDT USA AD SCH ATTN DOI FT BLISS
1 CO USA ORD CTR & SCH OFC OF OPS ATTN AHBN-O APG MD
5 ASST COMDT ARMY AIR DEF SCH FT BLISS ATTN CLASSF TECH LIB
3 CG USA FLD ARTY CTR & FT SILL ATTN AVN OFCR
1 COMDT DEF INTELL SCH ATTN SI&AS DEPT
1 COMDT ARMED FORCES STAFF COLL NORFOLK
1 COMDT USA SIG CTR & SCH ATTN DOI FT MONMOUTH
1 COMDT JUDGE ADVOCATE GENERALS SCH U OF VA
1 DPTY COMDT USA AVN SCH ELEMENT GA
1 DPTY ASST COMDT USA AVN SCH ELEMENT GA
1 USA AVN SCH ELEMENT OFC OF DIR OF INSTR ATTN EDUC ADV GA
1 EDUC CONSLT ARMY MILIT POLICE SCH FT GORDON
6 COMDT USA ENGR SCH ATTN EDUC ADV AHBBES-EA FT BELVOIR
2 COMDT USA SCH EUROPE ATTN EDUC ADV APO 09172 NY
1 OFC OF DOCTRINE DEV LIT & PLNS USA ARMOR SCH ATTN AHBAAS-OM
1 COMDT ARMY AVN SCH FT RUCKER ATTN EDUC ADV
5 CG USA PRIM HELICOPTER CTR/SCH & FT WOLTERS ATTN ATSPH-DOT
1 DIR OF INSTR US MIL ACAD WEST POINT NY
1 DIR OF MILIT INSTR US MILIT ACAD WEST POINT
1 USA INST FOR MIL ASSIST ATTN LIB BLDG 1512R08 FT BRAGG
4 USA INST FOR MIL ASSIST ATTN COUNTERINSURGENCY DEPT FT BRAGG
1 COMDT DEF AGT SCH FT BELVOIR
2 COMDT USA MSL & MUN CTR & SCH ATTN CHF OFC OF OPS REDSTONE ARSNL
2 COMDT US WAC SCH US WAC CTR ATTN AJMCT FT MCCLELLAN
2 HQ ABERDEEN PG ATTN TECH LIB
1 CO USA INTELL CTR & SCH ATTN DIR OF ACADEMIC OPS FT HUACHUCA
1 CO USA INTELL CTR & SCH ATTN DIR OF DOC & LIT FT HUACHUCA
1 COMDT USA C&GSC OFC OF CHF OF RESIDENT INSTR FT LEAVENWORTH
1 COMDT USA CA SCH ATTN OFC OF DOCTRINE DEVEL LIT & PLNS FT BRAGG
1 COMDT USA CA SCH ATTN DOI FT BRAGG
1 COMDT USA CA SCH ATTN EDUC ADV FT BRAGG
1 COMDT USA CA SCH ATTN LIB FT BRAGG
1 COMDT USA SCH & TNG CTR ATTN ACOFS G3 TNG DIV FT MCCLELLAN
1 COMDT USA SCH & TNG CTR ATTN ACOFS G3 PLNS & OPS DIV FT MCCLELLAN
10 COMDT USA INST FOR MIL ASSIST ATTN DOI FT BRAGG
1 LIBN USAIS FT BENNING
9 COMDT USA FLD ARTY SCH ATTN DOI FT SILL
1 COMDT USA ARTY SCH ATTN EDUC SERVICES DIV FT SILL
1 COMDT USA ARTY SCH ATTN EDUC ADV FT SILL
1 COMDT USA TRANS SCH ATTN DIR OF DOC & LIT FT EUSTIS
1 COMDT USA TRANS SCH ATTN LIB FT EUSTIS
1 USA INST FOR MIL ASST ATTN EDUC ADV FT BRAGG
1 COMDT USA C&GSC ATTN ATSCS-OJ (SPWAR)
1 COMDT ARMY QM SCH OFC DIR OF NONRESID ACTVY ATTN TNG MEDIA DIV VA
1 COMDT USA ARTY SCH ATTN LIB FT SILL
1 CG USA SCH & TNG CTR ATTN ACOFS G3 FT GORDON
1 DIR OF GRAD STUD & RSCH ATTN REHAV SCI REP USAC&GSC
1 COMDT USA AD SCH ATTN AKBAAS-DL-EA FT BLISS
1 COMDT USA AD SCH HIGH ALTITUDE MSL DEPT FT BLISS
2 DIR BRGD & BN OPNS DEPT USAIS FT BENNING
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1 DIR ABN-AIR MOBILITY DEPT USAIS FT BENNING
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1 CG USA SIG CTR & SCH ATTN ATSSC-DP-CO8 FT MONMOUTH